Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Part 97 of the	)	
Commission's Rules Governing	)	RM-8737
the Amateur Radio Service to	)	
Facilitate Spread Spectrum	)	
Communication	)	

To: The Commission

REPLY COMMENTS OF RONALD KLIMAS, WZ1V

Introduction

I have been a licensed amateur since 1976, and currently hold an Extra Class Amateur License and a General Radiotelephone Operator License. From the time I was first licensed to the present, my principal interest has been weak signal work (long-haul SSB/CW contacts) on the bands above 50 MHz. I am currently operational on all bands from 50 to 2304 MHz, have worked all states on 50 MHz, and have worked most states east of the Mississippi River on the 144 MHZ through 1296 MHz bands. I am a co-founder and current Vice President of an ARRL-Affiliated Amateur Radio Club, the North East Weak Signal Group, with over 125 licensed Amateur Radio Operator members throughout the New England area who all share the same enthusiasm for weak-signal work on the VHF-SHF bands.

News of the filing of this Proposal was very limited and I did not become aware of it until March 11, 1996. As a result, I was not able to prepare comments before the filing date of February 29th. Therefore, I am filing Reply Comments and ask that the Commission accept them as part of the official record in this proceeding.

Summary

Although I am in favor of developing new technology in the Amateur and Amateur-Satellite bands, including Spread Spectrum (SS) techniques, I am concerned that SS's widespread use, with no frequency restrictions, will cause major interference to EME operation, satellite operation, and to weak signal terrestrial work on the Amateur Radio bands. Therefore, I strongly suggest that any relaxation of the spread spectrum rules that the Commission may decide upon, should be accompanied by restrictions limiting it to specific frequency segments within the Amateur and Amateur Satellite bands. Otherwise, it has the potential to make reception of the relatively weak signals from amateur satellites, distant terrestrial stations and signals reflected

from the Moon, all but impossible in many parts of the country, particularly in urban areas.

In support of this contention, I cite both calculations made relative to potential SS signal levels and the ARRL's own statements with regard to potential interference which Spread Spectrum might cause.

Discussion

To obtain a measure of the possible interference that could result from only a single spread spectrum station, the following parameters are assumed:

Spread Spectrum station with effective power of 100 W ERP=+20 dBW
If spread over 10 MHz −50 dBW/Hz
Free-space attenuation at 20 km from the spread spectrum station in the 70 cm (420 - 450 MHz) band = −110 dB
Spread spectrum signal at 20 km = −160 dBW/Hz

A receiver with a 1 dB NF (common in satellite & weak signal work) = −210 dBW/Hz

This results in the spread spectrum signal causing as much as a 50 dB increase in the noise floor existing without it.

Even if the SS station has a power of only 1 W ERP (20 dB less), the noise floor would still be as much as 30 dB higher because of its presence. Similar calculations for other distances can also be done. For example, the spread spectrum signal would be 20 dB stronger at a 2 km distance. As another example, a 100 W transmitter and 10 dB gain antenna could create 10 dB more interference. Obviously, if the spread spectrum station is in close proximity to the satellite, terrestrial weak signal or EME, station, the degradation from the spread spectrum station's operation would be much greater.

The effect of automatic power control for SS stations using transmitters over 1 W is difficult to assess, but one can envision situations in which interference from other SS stations, as well as non-SS stations, might cause the SS station(s) to increase their power in order to retain the desired signal to noise ratio. In such a case, power control would do nothing to alleviate interference for other users of the band.

The received signal strength for EME stations on 70 cm is in the order of −150 dBm, many times even less. Obviously, because of such extremely low received signal strengths, ANY increase in noise floor would be sufficient to render successful EME work impossible. Therefore, significant use of SS, which might include 432 MHz would probably eliminate EME as a viable mode on that band.

In their petition, ARRL goes to some length to state that "unintentional triggering of repeater inputs" is not considered interference, and that therefore the section of the rules dealing with it should be removed. It seems to me that this proves that even they believe spread spectrum operation may well result in significant noise floor increases. Certainly if they are sufficient to trigger FM repeaters, they are sufficient to drastically degrade reception of weak satellite, terrestrial or EME signals.

Proposal

I believe that spread spectrum operation should be encouraged, as it may eventually prove to be a valuable mode for both terrestrial and satellite applications. However, I believe that it should be restricted to certain frequency segments so as to offer minimal interference to other modes, while still allowing experimentation. The Commission has done this in other rules.

To alleviate the kinds of interference cited, I believe that spread spectrum should not be allowed below 450 MHz. I know that the current rules allow it in the 420 - 450 MHz band, and it may be argued that this proves that spread spectrum poses no threat to other types of operation, since no reports of interference have been registered in the ten years since it was authorized. However, the ARRL admits in their Petition that SS operation has not been widespread. I am not aware of any SS operation.
In order to reduce interference to other Amateur operations on the 902 MHz and higher bands, I further recommend that spread spectrum be authorized only in the following segments of the Amateur and Amateur-Satellite bands:

905 - 928 MHz
1240 - 1260 MHz
2410 - 2450 MHz
3300 - 3445 MHz
All bands above 5500 except 5750-5770 MHz and 10.360-10.380 GHz.

Conclusion

I urge the Commission to not permit SS to continue in the 70 cm band and certainly not permit it in the lower VHF bands.
I would like to see spread spectrum develop and become a major factor in Amateur Radio, especially on the microwave bands.
But, I do not think it should be allowed to do so to the detriment of other modes of operation. It has not been demonstrated that it won't.

RESPECTFULLY SUBMITTED,

Ronald Klimas

Ronald Klimas, WZ1V

March 13, 1996